

ITEMS OF INTEREST.

VOL. VI.

PHILADELPHIA, JULY, 1884.

No. 7.

Shots from the Profession.

HOW ANÆSTHETICS PRODUCE ANÆSTHESIA.

BY J. F. SANBORN, M. D., DD. S., TABOR, IOWA.

[Read before the Iowa Dental Society, Council Bluffs, May 6, 1884.]

Dr. J. Hardman, President of our Board of Dental Examiners, in a communication to the *Dental Luminary*, says: "At the best, Anæsthesia is a step in the dark, and always partakes, more or less, of empiricism." There is need, then, for light.

To feel is to receive an impression by the sensory nerves. Anæsthesia means loss of feeling, or perception.

Sensation is an impression made upon the mind through the medium of the nervous system and the brain. The brain is the seat of consciousness; and the axis cylinder, the medium for conducting impressions from their source to the brain.

Sensations may be pleasurable or painful; and this covers a large range of experience.

Anæsthetics are used to allay pain. To understand how they accomplish this we must look into the mysteries of vital action, and so analyze them as to see how sensations are produced, how transmitted, where received, the medium of transmission, the force that transmits, and how anæsthetics prevents us from taking cognizance of sensation.

It matters not how perfect a steam engine may be; if there is not intelligence to direct, and a power to propel, there is no effective work accomplished.

So in the transmission of an impression: the vital principle receives the sensation at the periphery of the nerves, the axis cylinder is the medium of transit, the nerve-force the energy that conveys it; and without all three working harmoniously, no consciousness of the sensation can be felt. There must be in the extremities of the sensory

nerves an active vitality to rule and direct all impressions. Here are the nuclei of the nerve-cells. In size they are from one-half to the full size of the red blood corpuscle, a structureless mass of matter. Prof. Beale calls them "bioplasm." They are the only part of the tissue that has independent life motion.

The egg is a common representative of a cell; the yolk represents the nucleus, the white the formed matter, or the tissues.

The pabulum of the blood passes through the walls of the capillaries and the substance of the tissues, and represents the white of the egg, and constitutes the walls of the cells, to the center of the nucleus represented by the yolk. There it becomes a part of the living cell. While this process is taking place at the center of the nucleus, at the circumference—next to the part represented by the white of the egg—the substance of the nucleus is changed into tissue, which is represented by the white of the egg. In this manner the plasma in the blood is changed to tissues of the body, and is known as assimilation.

The living, moving, nucleus of a cell determines the character of the tissue formed, and is the only part of the cell having life; the part represented by the white of the egg has no more life than the shell.

The nucleus of the cell will average about one-fifth of the size of the cell; the formed matter constituting the remainder. As tissue is constantly being formed by the nucleus, the oxygen we breathe is continually oxidizing or burning up the formed matter.

The build up and break down of tissue is constantly taking place, from the earliest breath in infancy till life's changes cease in death; so that unceasing change is the marked characteristics of animal life.

The axis cylinder, or the center of the sensory nerves, is the medium of transmission of sensations, and may be represented by the telegraphic wire.

The *nervi nervorum* of the *neurilema* of the nerves have peripheral extremities everywhere present, so that if you wound a nerve in any part of its length, pain is the result. The nuclei of the nerve-cells are more or less distributed through the length of the nerve-tissue, to keep them in repair; but they are vastly more numerous at the periphery, and are there placed for the purpose of receiving and transmitting impressions to the brain.

Nerves have ganglia, fasciculi and filaments, and are so named for their fancied resemblance to a skein of thread:—tie a knot at one end and it resembles the ganglion; wrap the thread in one or more parts with tissue paper, and they represent the fasciculi, and each separate thread will correspond to the filaments.

Like the thread, the filaments of the nerve pass from their origin at the periphery, perfectly independent of each other, to the brain.

Sensations at the periphery of the nerve are transmitted to the brain by the filaments through the ganglia.

In the never-ending cycle of build up and break down of tissue, in common with other actions incident to animal life, nerve force is essential, as much as is heat to produce steam for the engine, to propel the long train of cars to their destination.

In the one, the end is attained by the action of oxygen combining with the fuel in the furnace, reducing it to the original elements from which it was developed in its growth, thereby setting free the stored-up force derived from the sun ; and in the other it is equally so in all gradations of animal life, from the ameba to man. The oxygen combines with the formed matter of the tissues, just as truly as it does with the fuel in the furnace, and we have animal heat that holds the temperature of the system at such a degree as shall make the action of oxygen on the tissues proportionate to the demands of vitality for nerve force, to carry on the operations of life.

The production of animal heat may be considered as a means to an end, whereas the generation of nerve force is the prime object of these changes.

Physics teach that the evolution of energy, or force, is always at the expense of organized matter ; the production of nerve force is no exception to this law.

We see how and where nerve force is obtained, and the medium for its transmission ; how shall we best prevent it from performing its allotted task, so that the sensation of pain shall not be felt ?

If it is desired to prevent the transmission of a telegraphic message, one of three things must be adopted :

1st—Remove the cells from the battery that no electricity may be generated ;

2d—Cut the wire so that electricity cannot pass ;

3d—Prevent the operators from receiving or sending the message.

So in order to produce anaesthesia, one of three things must transpire :

1st—Prevent the oxidation of tissues that no nerve force shall be evolved ;

2d—The rupture of the axis cylinder that must transmit the sensation ;

3d—The nucleus of the nerve cells, or, the granules of the brain, must be prevented from sending or receiving the impression, either of which would accomplish the end desired.

The 1st can be done by depriving the system of oxygen, to break down the tissues necessary to produce the nerve force.

The 2d by preventing the passage of the sensation by cutting the nerve, or by pressure on the axis cylinder, either of which are im-

practicable except in some severe cases of neuralgia, where the inferior maxillary nerve is cut to relieve the pain.

The 3d by preventing the action of the nuclei of the nerve cells from acting so that a sensation shall not be transmitted, or by preventing the action of the nuclei of the granules of the brain from receiving the impression when it arrives at the encephalon. We have always supposed that a hypnotic produced its effect by preventing the action of the brain, so that a sensation could not be perceived when it arrived there.

Of this 3d class, the pressure on the periphery of the nerves to prevent the nuclei from receiving the sensation, thereby producing a local paralysis, minor operations in surgery may be accomplished with but comparatively little pain.

As soon as the pressure is removed the circulation begins to return, and the nerve cells resume their activity.

In the application of this principle, by applying pressure from one to two minutes over the periphery of the fifth pair of nerves, we have removed from one to twelve teeth and roots in less than thirty seconds, and with comparatively little pain.

The 2d is of so severe a character that it is only used in the severest cases of neuralgia, and when the disease is between the resection and the ganglion of Gasser, no relief will be obtained.

This brings us to class 1st, or anæsthetics proper.

Atmospheric air is composed of nitrogen four parts, and oxygen one; and when inhaled the oxygen is in a pure state, free from any chemical alliance.

It is taken up by the red blood corpuscles and conveyed to every part of the system, and used in oxydizing the tissues. Anæsthetics prevent this action. How do they do it?

Anæsthetics are governed by natural laws the same as any other class of matter.

Scientific investigation teaches that inorganic matter is in an inert condition—a comparative state of rest; where all the elements in each compound are mutually chemically satiated.

The life force in nature is constantly forcing matter from this inert condition to a higher plane, where the relationship of the atoms and molecules are in an unstable condition, with a constant tendency to fall back to the lower plane.

Matter is subject to the laws of gravitation which forces it as near the points of attraction as possible; thus, water runs down hill, and all solids are ever tending towards the center of the earth.

So of matter raised by life force to a higher plane of existence, it has a constant tendency to yield to the forces of chemism and fall back to the state of rest.

Matter, then, while under the influence of life force, is in a constrained condition, held on this higher plane by the constant exercise of life force.

Vegetable life can raise matter only to a certain height; animal life force takes it there and raises it to a still higher plane.

The higher matter is raised, the greater the amount of force necessary to maintain it there.

The relationship that the different classes of matter bear to life, in the various tissues of the vegetable and animal kingdoms, is one of the most interesting and instructive studies that science unfolds to the wondering gaze of man.

It is the want of this kind of study that shrouds in mystery the operations of nature, and makes empiricism so common a commodity.

[Concluded in our next.]

ARTICULATION OF ARTIFICIAL TEETH WITH A VIEW TO THEIR BETTER RETENTION IN POSITION.

DR. W. E. DRISCOLL, BEDFORD, IND.

[Read before the Indiana Dental Society.]

Stated in the fewest words, the improvement consists in securing backward pressure upon an upper set of teeth, and forward pressure upon a lower set. No one will, I suppose, question the propriety of this as applied to an upper set. At first view, its application to a lower set seems more open to objection. Press the lower set forward and we utilize the only approach to a rim that can be left to many lower sets, that between the jaws under the molar teeth. Forward pressure makes this rim fit firmly to this part of the gum. A failure to do so is a matter of common complaint with those learning to wear artificial teeth. Such close fitting will produce soreness at first, but in time the parts will toughen the same as any other part of the gums.

How are we to secure the backward pressure upon upper sets and forward pressure on lower sets at the same time? It must be done by elevating the line of articulation at the front teeth as much as can be done with lower teeth extremely short, from the pins to the grinding surfaces of the molars. Teeth must be selected with this object in view, or the plan can not be carried to a successful issue.

Very often, four bicuspids must be left off to shorten the sets so they will allow the necessary depression upon the posterior portion of the gums. When setting up the teeth, leave a space between the front teeth that will allow an ordinary thickness of blotting paper to pass between their cutting edges when the molars are firmly set on their

grinding surfaces. After a few days or weeks wear, the front teeth will be found striking together freely as hard as is desirable, if not so much so as to require some grinding to again throw the main pressure upon the back teeth. The outside and inside cusps of the molars, above and below, must be on an exact level—outside ones no higher than the lingual or palatal ones. When an extreme degree of absorption has taken place, the superior molars will extend near an inch from the upper gums. But let no one hesitate to try them in that way, and the result will be a surprise. Where the inferior alveola is practically absent, care must be taken to set the six front teeth fully as far backward as the ridge should be, and in extremely discouraging cases it will at times be best to set these six teeth a little inside of where the ridge has been. This will, in some cases, leave the upper front teeth standing much more prominent or outside of the line of the lower ones. If this can not be remedied by setting the upper teeth under the gum without interfering with the upward slant of the line of articulation, then the hiatus must be endured, and in many mouths it will be found to amount to no real objection upon trial.

In cases where the short appearance of the upper front teeth would be an objection, an off-set may be made between the molars and bicuspids of each set that will secure or produce the desired backward pressure upon the upper set without the upward slant extending so far forward. This off-set may also be used where there is not room between the ridges to get the amount of dip necessary to a practical result; or to get the upper front teeth to show as desired.

The upper slant of the line of articulation might terminate at the first bicuspids; but this will not be found necessary, as a rule, and in some cases would defeat the attempt to induce the patient to wear teeth at all.

Where a portion of the lower natural teeth are retained, all points of articulation that have a tendency to press the upper plate forward, must be avoided, and all available points to construct slanting surfaces that will result in backward pressure upon the plate must be used. Sometimes this can be done by setting a tooth on each side, so as to receive a glancing stroke from the lower teeth, or prominences of the material of which the plate is made may be so placed as to shut down behind a posterior lower tooth on each side. Sometimes several of the molars are very much elevated above a plane with the teeth anterior to them, and have a very decided tendency to press an upper set out of the mouth. Such teeth, when leaning forward, must not be allowed to strike the upper teeth with their grinding surfaces; but to utilize them in keeping the plate in position, prominences of plate material must extend downward behind them, presenting an inclined plane for them to strike against, that will press the plate backward.

Patients may object to these prominences, slanting strokes, etc., at first, but when they realize their value there will be an end to objections.

Some critics may say this plan will require teeth to be made without regard to their natural appearance, or the restoration of sunken features, etc. Not so, if rightly understood and practiced. Although the points of contact of the opposite sets of teeth may be too far inward to restore the expression, this may be counterbalanced by additional material in the rims. And with a full rim and teeth, set well inward, the lips may and do take hold upon these rims and aid to retain them in their place. Very often teeth, instead of being assisted in this way to retain their place upon the gums, are forced from their position by the action of the lips and cheeks.

An accurate bite is necessary when these slanting surfaces and prominences are used in articulating teeth. To secure this, I have an improvement upon the plan mentioned two years ago. When the wax is placed between the gums, direct the patient to swallow at the same moment that the jaws close toward each other. This plan is so satisfactory as to leave nothing to be desired further in that particular. If a hard substance is embedded in the wax to arrest the closure of the jaws at the right distance from each other, the gum will generally be flattened at that point. So when the models are placed in the bite, the flattened points in the bite must be cut out that the models may go accurately to their proper positions.

In constructing teeth upon the cheap bases, I do not hesitate to say that all trying teeth in the mouth after grinding up and before being finished for use, is worse than useless. There can be no dependence in the way a patient will close the mouth with a loose lot of gutta percha therein. The length of the teeth, the fullness of the rims, and everything desirable to know can be ascertained by means so much more simple and practical that I do not consider it worth while to go into a description of them.

I have used amalgam in the following manner: The right superior cupid, the decay extending up under the gum so far I could not use the dam. I concluded to fill at the cervical wall with amalgam, letting the amalgam extend farther down towards the cutting edge on the palatal side of the tooth; the cavity was nearly half filled with amalgam. I finished it as I would any other amalgam filling, and filled the remainder of the cavity with Hill's stopping. At the next appointment, I adjusted the rubber dam, removed the temporary filling, drilling retaining points in the amalgam. The cavity was of the very easiest character to fill, and in polishing the gold I put a fine finish on the amalgam.

Dr. W. N. WILSON, Richmond, Indiana.

ASSIMILATION.

W. H. METCALF, D.D.S., NEW HAVEN, CONN.

It would seem impossible to follow the recent discussion in the "ITEMS," in regard to the assimilation, or non assimilation of free inorganic matter, with anything short of intense interest; since it promises to throw a little light upon a question which, to dentists and physicians, is growing to be one of the utmost practical importance. Thus far the discussion seems to have been closely confined to the question whether or not an animal, in its normal condition, can appropriate to its physical economy inorganic substances; inorganic substances meaning minerals, bases, or any of the chemical elements in their pristine purity. The term "*inorganic*" is, of course, accepted as in common professional parlance, and is not questioned as to its significance, nominally.

First: let us frankly state that we consider the great importance of the subject at issue a sufficient reason for our serious objection to these apparent premises. Our interest in the subject as physicians and counsellors to the afflicted, should lead us to investigate from a motive and standpoint of duty, coupled with an earnest desire to alleviate suffering; such is our mission. This being admitted, it is easily perceived that the point at issue is, not whether *animals can eat sand*, but whether our fellow men have the inherent power, in sickness or in health, to utilize so called inorganic matter, either when administered topically, or when taken into the alimentary canal, *not alone*, but with other food. The other premise to which we object is the acceptance unquestioned of the name *inorganic*, as meaning a something *without life, power of motion or function, unorganized*. If somebody will kindly tell us what "*life*" or "*motion*," is, what "*function*," and "*organization*," are, and will so define these characteristics of nature as to readily and plainly draw the line between the organic, and so called inorganic, then we will withdraw our objection. But he must first tell us the distinction between mechanical and vital dynamics; between the causes of osmotic impulse, and capillary attraction; between the galvanic and nerve current; and between crystallization, chemical affinity, and histotrophic agencies or plastic force; until then, we must refer to the term "*inorganic*," (with all due respect for ancient authorities,) as a misnomer, calculated to mislead the student of natural and spiritual laws.

The time for transcendentalism in scientific argument is at hand. The marriage between what is sensuous, and what is ideal is too evident longer to provoke the sneers of men of intellect; it is their separation which nowadays justly warrants ridicule.

Physico-theology is only in its swaddling clothes, but it is a lusty youngster, and no foundling, for each new sun sheds its rays upon new found relatives, who by virtue of their advanced intelligence, are ever ready and eager to acknowledge this monogenesis of modern times ; "Bob Ingersol" to the contrary notwithstanding. To us, it seems as though all things must possess life, because God created them ; but the truth, like the logic of the "free trade" issue, is not always applicable to the age in which it is discovered.

Positiveness, is a quality which commands our admiration, as we believe it essential to progress, but if Dr. Sanborn, of Tabor, has the ability to tell us whether a hen can assimilate lime-salts for the forming of shells for her eggs, or whether the bugs which eat their passage through many mineral substances, possess a gastric fluid which can dissolve these substances, this ability we claim is interesting only so far as it carries us into comparative anatomy. In other words, individual particulars never satisfactorily prove general results, but *vice versa*. Who would sanely search for protoplastic causes of art? Men like Diogenes are scarce. Let us look at a few generals or results, which would seem to prove that so-called inorganic chemical elements are assimilated by man. It is a fact of great significance that, in a neighborhood which has soluble alkaline earths or rocks for a base, the water has a hardness, and an alkaline reaction, and the natives are as a rule, people of large stature, and well developed bones and muscles, and when young have exceptionally good teeth. Our Vermont, Illinois, Kentucky and Tennessee giants attest to the reasonableness of this statement, as would the large boned inhabitants of other localities, were we to enumerate them. A residence in any of these localities for a few months, after living where the water is soft and free from lime-salts, will change the nature of the hair, skin and nails, to a very perceptible degree. The brittleness of the finger nails, under these circumstances is sometimes quite disagreeable at first. Is it not quite reasonable to attribute the cause of the many peculiarities which characterize and distinguish races, to the nature of the soil and water, when they exist, as well as to the hereditary tendencies? The soil determining the nature of the water, and the water influencing the nature of the user until the ages produce marked race distinctions.

The most noticeable distinctions of race, are cuticular, the color of the skin and hair are favorable examples of this fact; also their nature, or quality.

The temporary presence of so-called inorganic elements in the body, does not argue their non assimilation.

While we are dependent upon the vegetable kingdom for subsistence, we nevertheless believe, that we can also absorb, at the same time, so-called inorganic substances, and that the latter are at times

particularly essential to health and existence. In disease, we believe they are indispensable. The many cases of hyper-acidity of the blood, and rachitic diseases among children, demand the immediate administration of alkaline remedies, mineral tonics, etc., and the fact that mollites osseum is affected by such with difficulty, does not lessen our faith, knowing as we do, that the assimilative organs of children, are much more active and vigorous, than those of the fully developed adult. As dentists, we can all of us perceive in women during gestation, a rapid degeneration of tooth structure; this we believe can be effectually remedied by the proper vegetable diet, but such is not always convenient or obtainable, whereas the customary appropriate remedies, though so-called inorganic, seem at times to effect most marvelous results. To supply the demands of such a multitude and variety of tissues, as are found in the human anatomy, the blood must necessarily contain a correspondingly multitude, and variety of elements. It seems unfair to assert that this noble, this wonderful work of God, so wisely called by the ancients a "microcosm," should be dependent upon the assimilative functions of the inferior vegetable kingdom for its supply. Excretion of mineral substances does not prove their non-assimilation; for is it not apparent that diuretics are incorporated in the tissues of the kidneys? and do not other so-called inorganic drugs so influence the secretions of other organs, that a change of structure is most evident?

We are inclined to the belief that the human economy is like that of the microcosm, and that nothing is wasted which can subserve a purpose; thus making assimilation and excretion equally useful and necessary. The hair is a notable example of this fact, particularly the lanugs of the foetus; but what more striking examples can be cited than the teeth, bones, muscles and, in fact, the whole connective tissue of the body, which, though the products of the vital cellular economy, are at the same time excretions.

The prompt action of iron upon the blood, when administered as an emmenagogue, or for chlorosis, and its efficiency as a reconstructer in impoverished, or anaemic conditions of the same, are enough to dispel all doubts, as to its assimilation, at least to the extent of God-given usefulness. The supposition is that the metal, after reaching the stomach, is oxydized, combines with acids, and as, we read from very good authority, "it is by no means certain that the finely powdered metal may not find among the constituents of the gastric juice, the *organic principles* with which it is combined in hematosin, and, uniting with this, enter into the blood at once, in a state suitable for the part it has to play in the formation of red corpuscles." This idea does not by any means preclude that of its absorption and existence in the serum, in other forms of combination. In fact, it seems

to explain the double action of the metal: that of a tonic, in the blood, like any other absorbed medicine, of the same class; and that of a reconstructive agent, serving to increase the red corpuscles, by affording an essential constituent in a due state of preparation.

Lastly, we would speak of the vast number of children who inherit with a strumous diathesis, teeth of a chalky and weak structure. We believe from our own experience, and observation, that the proper administration of alkaline medicines will, many times, result in effective recuperation, and a very decided improvement, where there existed blood impoverishment, and imperfect tooth and bone nutrition.

The importance of this subject renders it difficult to do it justice in so short an article; but it demands the careful consideration of every conscientious practitioner, with the view of enlightening the profession, and benefiting mankind at large.

BRIDGE WORK.

A patient came into my hands recently who was a victim of the "bridge builders." He had been to *headquarters*. The attempt had been made to supply the lower bicuspids and molars, in a remarkably favorable case for the ordinary methods; but the "teeth without plates" plan had been attempted, two attempts had been made, and were an utter failure. Although paid for, I made a gold plate with rubber attachments, using light clasps on the cuspids, and the result was at once satisfactory. In the upper jaw, left side, were two good bicuspids, and a large molar, affording a good grinding surface for the low artificial ones. But the "bridge builder," in order to realize all that was possible from the patient, had attached a very small molar to the natural one, and which was of no more use than if it had been on top of his head. And to accomplish this brilliant achievement, what had he done? He enclosed this fine large molar with a gold band, and hung the tooth to it, on a good sized piece of plate. What would have been the results had it been allowed to remain? Although the band is put on with cement, in the course of time this would have disintegrated and worked out, the secretions would have worked in, and the tooth been girdled with decay. Then besides, the chewing on the artificial tooth on a yielding gum, would have effectually loosened the natural tooth, and so he would have lost a good sound tooth in order to secure a useless artificial one.

What next? Under the artificial tooth was found a collection of food which, upon the removal of the contrivance, and placed under the patient's nose, nearly upset his stomach!

These are the inevitable results of bridge work. The least objectionable form of this work is when it is attached to roots; but

then, the uncleanliness of the thing condemns it, so that one would suppose a cleanly person would think of that feature of it, even though ignorant of its destruction of the natural teeth in a vast majority of cases.

L. P. HASKELL, Norwich, N. Y.

THE GENESIS OF MAN.

JAMES R. NICHOLS.

Human beings find themselves existing upon a small planetary body whirling through space, but whence they came is a baffling mystery. Save in the Hebrew chronicles, no book, however ancient, affords any account of the genesis of man worthy of consideration; and no tracings on rocks or metals, no inscriptions or picturings in any part of the world, furnish a clue to the solution of the dark problem of the origin of the race. Those strange visitors from the celestial spaces, the meteorites, which are projected glowing with heat upon the crust of the earth, can give as ready answers to our questionings as the most learned philosophers. Like ourselves, they come out of the unknown, and in studying their history we experience emotions akin to those which result from the study of the history of our own origin. In no department of human inquiry has a larger amount of labor been expended or more exalted talents enlisted; and the outcome, although unsatisfactory, is very interesting. It cannot reasonably be questioned that man has been a resident upon the earth for a long period; a range of centuries, perhaps, which carries us back to the Palæolithic age. As we recede, however, into the darkness of early geologic times all traces of him are lost, and although the fossil remains of strange reptiles and animals are plentiful, fossil man is missing. No coal seams, or strata of ancient sandstone, reveal in hardened lines his noble, upright form.

Nothing whatever is known of the *time* of man's advent. We may speculate and pile hypothesis upon hypothesis, but we are not thereby introduced to any clearer light. The researches of archæologists, ethnologists, geologists, biologists have been well-nigh exhaustive, and unless new discoveries are made barriers to further knowledge have been reached.

Life can only evolve life; a rock cannot evolve an egg, or supply warmth to hatch it when evolved from life sources. It is possible for man to bring together in accurate measure the chemical constituents of an egg, but by no possibility can he supply the mysterious vital principle, or bring life out of his mixture, although he may comply most carefully with all the known conditions under which life is supposed to be produced. In no way is it possible for one to escape

from the conviction that the chasm which separates the organic from the inorganic, life from death, is a broad one, and no research has penetrated or crossed the rayless gulf.

Man has two natures, clearly defined, and both tending towards distinct ends,—one perishable and the other imperishable. There are not insuperable difficulties in the way of understanding how man might be evolved physically from lower forms, but no stretch of the powers of comprehension enables one to conceive of the evolution of *mind* from primitive forms, and there is no chain of facts which lend reasonable coloring to such a belief.

The mind of man, so far as any traces of its action are discernible, has always exhibited enormous superiority over that of the highest of the animal races. There is, in fact, so far as our powers of analysis guide us, no close analogy existing between the mind of man and the instinct of animals; their mental capacities are limited; man's infinite matters has no limit. The mind of man is the great overpowering force in the world, a principle dominating everything. No form of energy acting under law has escaped its control, no physical forces have become its master; all bow to its behests and become its servants. It must be a supernatural principle, a distinct creation, a divine essence, a mighty force, standing apart, and designed to stand apart, from all the other forces of nature.—*Whence, What, Where.*

THE GOODYEAR VULCANITE COMPANY AGAIN.

DEAR ITEMS: As your journal is set for the defense, as well as the enlightenment, of the profession, I have thought it right to place before your readers a statement in regard to a base fraud which has been perpetrated upon me by the Goodyear Dental Vulcanite Company of Boston, Mass. About a year ago, I received a letter from them, stating they held judgment against me which, together with costs, amounted to over two hundred dollars, which they would compromise. Not wishing a judgment to stand against me, and not doubting the truth of their statements, I paid them one hundred dollars to satisfy this claim. A short time ago, I consulted the records of the court in which suit had been brought, to see if proper acknowledgment had been made. To my surprise, I was informed by the clerk of said court that the suit had been dismissed some three years previous, no judgment ever having been rendered by the court against me in favor of this company. So, you see, by falsification and threats they succeeded in making me pay the costs in a suit they had lost,—they now refuse to make amends. I don't know that another member of the profession could have been duped in this manner, but if a warning can do any good, this is submitted for publication. The documents to substantiate this statement are in my possession.

J. W. P.

PYORRHŒA-ALVEOLARIS.

DR. W. H. STEVENSON, WABASH, IND.

(*Trans. Ind. Asso.*)

This disease seems to be very prevalent; at least it occurs very often in my practice. This frequency has led me to seek for the cause. I have entirely failed to get any satisfaction from text books or journals, and also have had no better success when seeking information from other dentists and physicians. About one year ago, a patient called on me to have his teeth cleansed. I found them in a very bad condition; at the slightest pressure blood and pus oozed from the gums and alveola. The teeth were so loose that it seemed as if they might have been extracted with the fingers. There was some tarter on the teeth, at the margin of the gums, which I removed, and polished the surface, I gave him an astringent wash to use, and requested him to return in one month, which he did. In again examining his gums I found very little change. The gums were a little firmer, the teeth were cleaner, but still loose, with pus and blood oozing from under the gums as before when pressed upon. I made inquiries about his habits of life, but failed to learn anything that gave me a clue. I did not, however, relax my efforts to solve the problem. In a few days I was called to his residence to extract some teeth for his mother. On examining her mouth before extracting, I found the mouth and gums in very much the same condition as that of the son. I extracted seven teeth (all she had) from the lower *alveola*. I then asked about the loss of the other teeth. She told me they had been taken out on account of scurvy; that they had been entirely sound, there not being a cavity in any of them. I was then requested to clean a sister's teeth, which I found in a similar condition. I also examined the mouths of two other sisters, and found the teeth and gums in the same condition. The father of the family was entirely without teeth. The more advanced in age the patients, the worse the condition of the case. I questioned all of them, but gained no information that would throw a ray of light upon the subject.

While at the house, dinner was announced, and thinking that possibly the dirt might have something to do with the condition of their teeth, I scanned the food closely. I found upon the table fat salt pork and ham, with mashed potatoes and other vegetables. Everything appeared to be gotten up in good shape, but on taking the first mouthful, I found it was salted to saturation, and everything on the table that it was proper to season with salt was salted to the extreme. I inquired if they always used so much salt in their food as on that occasion, and found it was always the case. Indeed, they said they could not enjoy a meal without an abundance of salt.

The first-mentioned gentleman, upon arising from the table took a pinch of salt and went to the door and used it in cleaning his teeth, which he said he had been doing for years by the advice of a dentist.

Upon questioning those of my patients, who are affected in a similar way, I find that without exception they are addicted to the excessive use of salt. I am slightly troubled in the same way, and when I use more than the usual amount of salt food, I find it grows worse, but always improves upon a change of diet to a more exclusively vegetable diet, and less salt. The effects of an unusual or excessive use of salty food in my own case, are as follows ; the gums become loose and flabby and painful to the touch ; the teeth become loose and sensitive, particularly as to cold air.

A few days ago, a lady came to get an upper set of teeth. She had eight lower teeth remaining. Her gums and teeth were in the same condition as the cases before mentioned. I found upon inquiry that she not only used an excess of salt in her food, but also salt itself by the spoonfuls. In every case where I have found this condition of the teeth and gums, I have found upon inquiry that the patient was addicted to the excessive use of salt.

Now, let us see what are the disease-producing effects of salt, when used to excess, upon the human system : We find that "the teeth are sensitive to air and touch," "pain in the teeth," "decayed teeth feel loose, burn, sting and pulsate ;" "gums sensitive to warm and cold things ;" "swollen, bleed easily, are putrid ;" "epulis ;" "fistula dentalis ;" "great longing for salt ;" "tooth-ache, with swelling of the cheeks ;" "pain in the lower jaw, and submaxillary glands ;" "throbbing tooth-ache ;" "painful swelling of the gums, which bleed readily ;" "scorbutic putrid inflammation of the gums ;" "bleeding of the gums ;" "ulcer on the gums, painful day and night ;" "in the mouth and on the tongue, blisters and ulcers, with smarting, burning pain when touched by the food."

Now, here we have, in the pathogenetic effects of salt, a pretty accurate description of the disease in question, which might also be called scurvy. Salt also effects every organ in the body when used in excess, as may be seen by consulting any standard author who gives its pathogenesis. The principal antidotes are sweet spirits of nitre, which may be used by inhalation, and small doses of phosphorus, internally.

I wish to call the attention of the profession to this subject, that others may follow up the same line of investigation, so that finally the truth or falsity of the theory that an *excessive* use of salt is the cause of a larger portion of the cases of pyoalveolaris may be ascertained.

DENTAL MEETINGS.

American Dental Association, at Saratoga, first Tuesday of August. Dr. E. T. Darby, Philadelphia, President ; Dr. A. W. Harlan, Chicago, Secretary.

National Dental Association, at Washington, D. C., July 22d. Dr. J. B. Rich, New York, President ; Dr. R. Finley Hunt, Washington, D. C., Secretary.

Missouri, at Sweet Springs, Tuesday, July 8.

New Jersey, at Long Branch, Wednesday, July 20th. Dr. F. A. Levey Orange, President ; C. A. Meeker, Newark, Secretary.

Pennsylvania, at Wilkesbarre, Tuesday, July 27. Dr. S. H. Guilford, Philadelphia, President ; Dr. E. P. Kremer, Lebanon, Secretary.

Virginia, at Charlottesville, Tuesday, August 19. J. Hall Moore, President ; Dr. L. M. Cowarden, Richmond, Secretary.

Wisconsin, at Milwaukee, July 20. Dr. J. S. Reynolds, Monroe, President ; Dr. R. G. Richter, Milwaukee, Secretary.

The structure of a tooth is very succinctly given below by Dr. F. M. Hamsher, of Delphi, Indiana.

The dentine is the larger portion of the tooth structure. In density it ranks next to enamel. It contains seventy-two per cent. of organic matter and consists of an infinite number of tubes and inter-tubular substance, which is dense and granular.

The tubes are wavy in their course, extending from the periphery of the dentine to the pulp-chamber, averaging one-ten-thousandth of an inch in diameter. They sometimes divide in their course, and anastomose with each other and with the canals of the cementum.

From the pulp, along these tubes pass fibriles, which perform the function of nerves ; and like them, are most sensitive at their peripheral terminations.

There are also transmitted nutrient fluids, which supply both the organic and inorganic substance.

The inter-tubular substance consists of fine granules, is transparent, and forms the bond of union of the tubes.

The enamel is the harder portion of the tooth substance, and contains the smaller part of organic matter. It is composed of hexagonal rods or prisms, radiating in a direction parallel with the tubes. They are so adapted and fitted together that there is scarcely any space between them, the ends are adapted with the dentine. The office of enamel is to cover and protect the tooth, and a tooth that is robbed of this protection in any way will soon succumb to the influence of the destructive agents. We see by the structural arrangement of the prisms that the greatest possible strength and power of resistance are attained.

THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT THE TRUTH,
SO FAR AS IN ME LIES.

DR. E. F. HANKS, JERSEY CITY, N. J.

[Read before the New Jersey Dental Society.]

The particular burden of my theme is failure and success in the salvation of the teeth, and the many strange theories and assertions made before such bodies as this. My theory about the saving of teeth is to me very plain, but to you may sound strangely. When the mouth is in such condition that caries is formed in the teeth, then caries may again be expected, however well they are filled, provided the relations of the teeth to each other and the condition of the mouth remain the same. I contend that our sheet-anchor (after thorough work, which is, of course, imperative,) is the change in condition that occurs somewhere about adult age, and the change in the relation of the teeth.

I believe that no filling material exercises any medicinal or curative influence, and that all metallic fillings exercise, in a slight degree, a harmful influence, from their susceptibility to thermal and magnetic influences. I look upon the filling of a tooth as the stopping of a hole, and he that plugs the hole the tightest stands the best chance of saving the tooth, as the probabilities of success must be best where moisture does not penetrate. But after we have done our best, what have we got (if we have filled with gold or amalgam)? A nice mechanical joint of metal against bone, a conductor against a non-conductor. Does any man in his senses, believe that this is better than a sound tooth, whole in all its parts? Do any of you believe that the filled tooth is better able to withstand the attack of caries than the sound one? But if the sound tooth should become carious within the year, that is a matter of course. But should the filled tooth show the attacks of caries around the fillings in the same time, that is proof positive that the work was poorly done. Out upon such nonsense. It is the childish babble of infants trying to set up a standard so high that it is only reached in the minds of flighty enthusiasts.

Of course, it is utterly impossible to enter into the many and subtle reasons why some teeth become carious in the same mouth that others do not, while all are subjected to the same influence; why certain teeth will show a decided tendency to caries and as suddenly cease, while at the same time other teeth in the same mouth are wasting away under the attack of caries; why old dead and carious teeth, poorly filled with amalgam, will outlast the best efforts of our best men with gold. I am not speaking of particular cases, I am not arguing from the old woman's standpoint, that because my teeth don't do thus

and so, no person's must. I wish to state a general proposition, the exceptions from which prove the rule, as there is no general rule without exceptions, that filled teeth are as liable to the attacks of caries as sound ones, provided the conditions and relations are the same.

A dentist stood among us last year and with a great deal of emphasis said that he had patients with frail teeth that he had saved, father, son and daughter, the whole family, yea, even to the very wisdom teeth thereof, with gold. Now, gentlemen, this statement was, I think, very misleading. In the first place, the gentleman said he had patients with frail teeth that he had saved in the manner stated. So have we all of us, perhaps, a few exceptional cases where in all probability a change has taken place for the better. But his dogmatic manner, his emphatic speech, everything he said; left the impression that it was an every-day matter with him, that he was uniformly successful with this class of teeth. I will admit the gentleman's skill as an operator—we all do; it is a fact capable of demonstration. Then, why is it necessary for him to make statements or inferences that we all know to be at least theoretically untrue. Whether so in fact we may never know, as the principal witness is on the other side, and we have no means of knowing to whom his dissatisfied patients go.

This half statement of the gentleman referred to above reminds me of a famous surgeon of New York. He had an operation to perform on the hip joints of two boys that necessitated the removal of the upper portion of the thigh bone and perhaps the joint itself. By the way, one of the boys is now a promising young D. D. S. of Brooklyn. The great difficulty of the operation was to remove the bone so as to leave the periosteum practically uninjured, so that new bone would grow to replace the old. The boys, after the operation, had to undergo all sorts of tortures, having weights attached to their feet to prevent contraction, etc. After a long time, our young dentist recovered and regained almost the normal use of his leg, and, as a matter of course, the surgeon was very proud of his success. The poor boy was brought up by the Professor very often, and lectured on and examined and questioned by the students at the Medical College, until he was wearied out and thoroughly disgusted. So he thought of a little game to break it up. Upon being called upon the last time, he laid in with one of the students to ask the Professor what became of the other boy who was operated upon at the same time. The Professor pretended not to hear, and went on describing the various methods he had used to accomplish the desired object. Our young friend had not calculated for this, but was equal to the occasion, so he signaled his friend to ask again. He did so. Still the Professor was very deaf. But our D. D. S., that was to be, piped up in a loud voice and said, meanwhile looking as innocent as a lamb, "Oh, he *died*."

This little story applies to us as dentists, particularly the best ones. They do things that perhaps are not reserved for the common herd to do. But because they can do so much, is it necessary that they should imagine themselves demigods, and talk as if there was no such thing as failure? "Upon what meat have these men fed, that they have grown so great?" They are so puffed up with conceit, they forcibly remind me of "Puck's" picture of the great senator, in which he is represented as a bursting balloon over-filled with gas. We all make failures; there is not that dentist alive that don't make them. It must be so when we look at the nature of the case. Given a substance, soluble alike in alkalies and acids, and bathed in a fluid containing either one or the other, from time to time, we are expected to put in an everlasting filling. The filling is all right if well put in, but how about the substance that seems so hard to the touch, but that melts in some mouths like ice before a summer sun?

A MOTHER TO MOTHERS.

(From *"Southern Dental Journal"*).

MRS. M. W. J.

There is one important point that we have not considered, in connection with the eruption of the baby-teeth, and that is; *what food* is best suited for the infant's stomach, during the transition from mother's milk to a regular diet of solid food?

The first of all foods is, of course, *milk*. It has been ascertained, by chemical experiment, that the difference between pure, unadulterated cow's milk and the milk of the human mother lies mainly in the larger proportion of *sugar* in the latter, and the smaller proportion of *caseine*; cow's milk forming a more tough and indigestible curd. The most eminent of the more recent authorities on the subject of Infant Diet however, authorize the free use of cow's milk, if it can be made a matter of certainty that it is pure and unadulterated.

Milk from the Jersey and Alderney breeds is too rich in cream for the infant stomach; the Ayrshire cows furnishing a fluid more nearly resembling human milk. Milk for an infant should be always from the same cow, which should be young and healthy, supplied with plenty of good pasturage, and sweet clean feed and pure water, and kept quiet and gentle and in good condition. When such milk as this cannot be obtained, and it is rarely possible in large cities, (and not always even in the country), Dr. E. N. Chapman, in his valuable work, entitled "*Infant Diet*," says that the nearest approach to mother's milk, "with the addition of the valuable properties of lime," is prepared as follows:

"Take of condensed milk two teaspoonsful; water twenty-four teaspoonsful; lime-water, four teaspoonsful; powdered sugar, half a teaspoonful; salt, a small pinch.

"Having brought the water to a blood heat, measure the milk accurately by dipping it out with one spoon and pouring it into another and having mixed and stirred the several ingredients together, the quantity for one feeding is prepared.

"If milk, fresh from the cow, be used instead of condensed milk, it should, if to a certainty unadulterated, be diluted in one-half water, and then the lime-water and other ingredients added in the same proportions as before given.

"If a bottle is used, fit it with a black rubber nipple instead of the poisonous white, (which is whitened with arsenic), and draw a half teaspoonful of spirits, diluted with water, through the rubber after feeding ; this prevents fermentation, but the nipple should be renewed frequently, as it is almost impossible to keep it clean and sweet."

Of the different ingredients here combined he says :

"A long series of experiments warrant the following conclusions :

"The constituents of milk are blended together in condensed milk, as when fresh milk has been scalded, (*not boiled*).

"Condensed milk owing to this change, and the removal of a portion of the caseine in the process of condensation, is better adapted to the stomach of an infant than milk fresh from the cow.

"Both plain and condensed milk are, by the addition of a proper proportion of lime water, closely assimilated to mother's milk, the caseine being held in emulsion until the milk has been intimately mixed with the gastric juice, and then it is precipitated in such a state of minute division as to be readily digested."

"Salt aids in the stability of the emulsion and in the solution of caseine, and in some way, not well understood, promotes digestion, absorption and assimilation. Sugar of milk is also another essential element."

Dr. Chapman is very decided in his opinion of the value of *lime-water*, saying in another place :

"Lime-water and milk is not only food and medicine combined for the infant, but is equally invaluable later in life when the functions of digestion and assimilation have been seriously impaired. A stomach taxed by gluttony, irritated by improper food, inflamed by alcohol, enfeebled by disease, or otherwise unfitted for its duties, as is shown by the various symptoms upon indigestion, dyspepsia, diarrhoea dysentery and fever, will resume its work, and do it energetically, by an exclusive diet of lime-water and milk. A goblet of cow's milk, to

which four tablespoonsful of lime-water have been added, will agree with any person however objectionable the plain article may be: will be friendly to the stomach when all other food is oppressive, and will be digested when all else fails to afford nourishment.

"The blood being thin, and nerves weak, the nutrition poor, the secretions defective, and the excretions insufficient, nature here offers a remedy as common as the air, almost as cheap as water. In it all the elements of nutrition are so prepared by nature as to be readily adapted to the infant or the adult stomach, and so freighted with healing virtues as to work a cure when drugs are worse than useless."

Oatmeal furnishes a valuable article of infant diet, prepared as follows: One cup of oatmeal to one quart of water, soaked over night and then boiled until it thickens perceptibly; then strain, sweeten and add milk, prepared as above, in equal proportions at first, but gradually reducing the milk, as the babe becomes accustomed to it.

"If the child is inclined to constipation, "Nestle's Mother's Milk Substitute—Lacteous Farina"—will be found of inestimable value.

When the babe *wants to bite*, give it oatmeal or Graham crackers, instead of sweetcakes or fine flour biscuit.

The juice from a tough strip of lean, raw beefsteak, long enough to be held firmly while sucked, is easy of digestion and very nourishing; soup, too, is good, but it should be a clear broth, not too strong, and without vegetables, though it may be whitened with rice, or barley, and strained.

A little later, eggs are suitable; also sweet or Irish potatoes, finely mashed and made of the consistency of cream, with milk and lime-water.

Gradually add other articles of light, easy digestion and good nutritive qualities, including ripe fruits, accustoming it to the solid food necessary for the exercise and strengthening of the teeth themselves after the molars appear.

Do not be anxious to have your babe *too fat*, *for fat* is not always *flesh*. Abnormal fat is as much out of place, and as little to be desired in a healthy baby, as is *a fat man or a fat horse*.

After all the twenty teeth of the first set are in place, govern the diet of your child by the general rules laid down in the preceding chapters for the regulation of your own diet, and you cannot go astray.

Another important point to be borne in mind, with regard to this period of life, is that children require food more frequently than older persons.

At this period of rapid growth and development, all the functions of life—respiration, circulation and digestion—are proportionately rapid, as indicated by the heart-beat and the pulse.

Pereira says: "In children the function of nutrition is more active than in adults. They have not merely to repair the daily waste—that is, to renovate their tissues—but to grow. Their functions of circulation and respiration are, therefore, more active than in after life, and they require food—that is, substances to support the process of respiration—to be administered at shorter intervals."

Food containing larger proportions of carbon and hydrogen furnish the elements of respiration or serve as "fuel to be burnt in the lungs."

Children therefore require a larger proportion of such food than adults. Arrow-root, tapioca, sago, and other starch foods, supply the elements of respiration, or fuel for the lungs, only, and although important for this purpose, must be supplemented with food containing nitrogen—as milk and the cereal grains, wheat, oatmeal, etc.,—to furnish the elements for the growth of bone and muscle. But I have already endeavored to make this plain to you in a preceding chapter. The same general rules that were laid down for the regulation of your own diet, should govern that of your child.

With systematic diet, regular meals, (five a day, gradually reduced to three), fresh air, and suitable dress, the baby unless exposed to contagious, or subject to hereditary disease, may be kept in health, and the baby-teeth preserved intact, until nature is ready to replace them with a permanent set.

CIRCULATION IN THE DENTAL TISSUES.

DR. HENRY S. CHASE, ST. LOUIS.

The better we become acquainted with the general physiology of the teeth, together with their microscopical anatomy, the more correct views we will get of their microscopical physiology; all are correlated. Anything like a thorough study of the minute structure of the teeth will reveal the fact that all portions of a tooth are more or less intimately united by a system of lakes, canals, and other larger or smaller areas of fluids, by which blood plasma entering at any one dentinal canal, dental lacuna or other microscopical sea, *may* be able to pass through this irrigating system to the most remote points from which it commenced its course, and also return again to the point from which it started, either wholly or partially, by *another* route.

The terminal ends of the dentine tubes are intimately connected with innumerable small fluid areas or ponds with cementum cells; and they, again, with same kind of areas under the pericementum, as those that constitute the dividing territory between the dentine and cementum.

The dentine tubes, themselves, are closely connected by their smaller branches, which are so numerously given off by each canal ; and the stellate, or cementum cells, are as truly connected with each other, and with a variety of open areas of larger or smaller capacity. There is a system or area of small cells which divide the dentine from the enamel ; and by some it is asserted that an occasional dentine tube is seen to invade the enamel territory for quite a distance.* The enamel is an organized structure, being built up by cells, and having a striated make-up, which indicates separate histological elements. The fact that resorption of the enamel itself takes place in the shedding of deciduous teeth goes a long way towards proving the permeability of these tissue to circulating fluids.

Even, if there was no open communication between dentine, cementum and enamel, the fact that all of these tissues have an animal membrane for their basis would insure a circulation of fluids through them by the process of exosmosis and endosmosis, while the specific gravity of the teeth is no greater than it is. And I think it is allowable for me to go further, and say that even if the tooth was a homogeneous structure, and composed of the same organic and inorganic materials as at present, with the same specific gravity, even then there could be a passage of fluids from one portion of the exterior to another portion of its interior.

In dental circulation we have—there is every reason to believe—osmotic and capillary attraction to carry the blood plasma along. Besides the force of the arterial wave, which is felt in the perisementum and in the dental pulp, and which transfers its momentum more or less to the currents of the canalicular and lacuna systems, there is yet a powerful force set free to act in the pressure of the teeth roots in the alveoli by the forcible occlusion of the teeth in the acts of mastication, thereby compressing their arteries and forcing the plasma onward.

As the circulation of the sap in the tree is produced by a variety of simple causes, so we have a similar result in the dental circulation.

As the teeth, as a necessity of their function, are necessarily *near* the inorganic kingdom, so the necessity of a rapid or abundant circulation is limited, after the organ has been thoroughly developed and perfected in all its tissues.

Therefore, we may observe the deciduous tooth is more highly organized than the permanent one, viz.: a system of more open or larger canals and lakes, and a lingering among its tissues of the original formative cells, ready at the proper time to take down the structure they once built, when it is no longer desired in the oral cavity.

The more *compact* and dense from lime salts any part of the tooth is, the more glassy and without structure it appears under the micro-

*I am sure that a slight crack in the specimen is often taken for a dentine tube in this locality.

scope. That portion of a tooth which has the greatest specific gravity, is that part which will look the clearest and hyaline under the microscope. Therefore when unusual calcification of a part has taken place, its tubular, lacunar, or porous structure is supposed to be packed with crystallized lime salts, thereby obliterating the whole or part of the cavities, and rendering the part clear under the microscope.

Tubes, cavities, spaces, look dark under the instrument.

In badly calcified teeth there are a great variety of dark markings both in crown and roots. In deciduous teeth, during their whole oral life, and more especially during the time of resorption, they are very, strongly, numerously, and variously marked. In making *cross* sections of dentine, we see the open tubes as *bright* round points of light; while another section, lengthways of the dentine of the same tooth will show us the dentine tube as a *dark* line. It is thus that we can easily decide where there are tubes, lakes, spaces, etc.

OFFICE HYGIENE.

C. B. ROHLAND, D. D. S., ALTON, ILL.

There is perhaps no other subject of such prime importance to the dentist, as that which involves the consideration of his health, and there is probably no other that has received so little attention, either in society or journalistic discussions. Its study should overtop even those subjects which relate to the development of mechanical and artistic excellence. For it goes without saying, that a sound body is a prerequisite to the proper use and development of any of the faculties. Good health must be the condition of the organs that are expected to give the best of which they are capable. The brain clogged with dyspeptic humors, the eye befogged with bilious vapors, and the hand trembling from nervous exhaustion, are certainly unequal to the conception and execution of the delicate problems, which, in our profession, are of daily occurrence, supplemented though they be with the best intentions, and the most honest endeavors. Study, training, and integrity of purpose, only find their due expression, when combined with good, steady nerves, enduring muscle, and an unclouded brain. Good health holds the key to good work. It is the *sine qua non* to excellence in all departments of human labor. It is the "*open sesame*" to the best there is in use. Without it, we only give faint promise of ourselves, only a shadowy outline of what we should be. This, of course, applies to all professions, but particularly so to ours, the excellence of whose work depends so much on the physical and mental clearness of the operator.

The impression that seems so largely to prevail, that the profession of dentistry is a very trying one, is undoubtedly correct. But that its followers sooner or later must of necessity break down, and that, as a rule, only the exceptionally strong are able to stand the wear and tear of daily practice, is, I think, generally speaking, a mistake. No profession can, of course, be injudiciously followed without detriment to the physical well-being. Each calling has some features peculiar to itself that make special calls on the endurance, or may develop special dangers to the health. In so far, our profession is not exempt, and that it has its victims, who through ill-judged zeal, carelessness, or ignorance, are being needlessly sacrificed, is also, alas! too true. Recognizing then, the fact, that our profession is, indeed, a trying one, and that there are special dangers to health in the path of our daily practice, it surely is but the part of wisdom to give them due consideration, and so arm ourselves as to make them comparatively harmless. This then, is the subject of our present inquiry: Wherein lie these lurking dangers; from what quarter come the special drafts on our endurance, that we as dentists are particularly liable to; and what must we do to guard ourselves against them? Generally speaking, the mere mention of the trouble and its peril, will of itself suggest its proper remedy.

First and foremost to engage our attention, is the confinement incident to our work. In a busy practice, nearly all the time during working hours is spent within the four walls of the office. What, then, is the prophylactic suggested? Naturally, out-door exercise, and due attention to the condition of the air in the office. Exercise for both mind and body is needed, and should be freely indulged in, as considerations of age, health, and circumstances may permit, and should be sufficient in quantity to bring all the muscles and faculties which lie dormant during the day into healthy activity. In the office, pure air and plenty of it is essential. Food, drink, and air are the three absolute necessities of our existence. On their purity and wholesomeness is our health conditioned. If the two former are offered us, we can refuse, we can do without them for a considerable length of time, if they are not to our taste, or we have reason to consider them unwholesome. But breathe we must. And pure or impure, fresh or noxious, we have no choice. We are compelled to feed on the air around us. When in repose we exhale, it is estimated, through the lungs alone, about six cubic feet of carbonic acid every ten hours, beside some organic matter. When at work, or in certain conditions, this amount is increased. But carbonic acid and organic matter are also exhaled from the skin. It is not very far out of the way to say, then, that at the chair, the patient and operator will each emit a volume of carbonic acid, organic matter, and watery vapor,

'equal to at least one cubic foot an hour. Now, it is estimated, that not much over two parts in ten thousand of these excreta are needed to render the air unfit for respiration. The capacity of a room twenty feet square and ten feet high, is just four thousand cubic feet. That is to say, to make the application, an office of that size, will contain just four thousand cubic feet of air. In order to keep this respirable for but two persons, it will have to be entirely changed then, about two and a half times each hour. It can readily be seen, that to effect this rapid change, will require very efficient ventilation,—that cracks, crevices, keyholes, and the stove are not equal to the occasion. If the office is not supplied with efficient ventilation, doors and windows must be made to do duty as such, care being taken, that the vicinity of the chair be kept free from drafts. When the weather will permit, it is better to keep up direct communication with the open air, by means of a window, either wholly or partially lowered, and trust to additional fuel, when needed, to keep up the temperature. The hotter the fire, the more rapid the ventilation. But not only is air needed from the outside, but what is brought in must be kept free as possible from all odors, or noxious vapors. There must be absolute cleanliness. The spittoon must receive particular attention. If remedies of pungent odor are used, they should be handled with care, the bottles not allowed to remain open longer than necessary, and if feasible, kept in another room. Cotton saturated with such medicines should not be allowed to remain in the spittoon or waste basket, but at the first convenient opportunity should be removed. Medicated air is all well enough in its way, but for general use, air, pure and unadulterated, is sufficient in itself. In the laboratory, especially if connected with the operating room, the odors and vapors peculiar to itself, must be taken care of. The kerosene stove, the vulcanizer, the battery, should be kept under a funnel, and the vapors conducted into the stove pipe, or better still, if practicable, into a separate flue, with good draft. Nothing is so conductive to headaches, as the inhalation of the fumes from a coal oil stove or vulcanizer. If a flue or stove pipe is not available, thorough and rapid change of air must be brought about, by the best means at hand, keeping the windows open, and passing as little time continuously near the vulcanizer, as possible. The gist of all of which is, the necessity of keeping the air we breathe pure. A truth, old and trite as proverbs, familiar to every school boy, but none the less important, and none the less frequently disregarded for all that. Absorbed as the operator becomes in his work, the insidious influence of air gradually becoming fouler and fouler, remains unnoticed, and its attendant consequences of headache, dizziness and lassitude, are seldom attributed to the right cause. Pure air, and plenty of it, must be had at any sacrifice, and attention to this

requisite should never be allowed to flag. Should it seem advisable at any time to fumigate the room, coffee, gum olibanum, or any of the spices, may be thrown on a hot shovel or stove-plate. Coffee particularly seems to have an efficacy, peculiarly its own, for overcoming bad odors, but it should be remembered, that this only loads the air with more organic matter. It only sugar coats the offensive pill. To disinfect, any of the ordinary disinfectants may be used. Carbolic acid and its compounds, permanganate of potash, the chlorides, the sulphates, all have their use, and will be more or less efficacious. But there is nothing better, or more thorough, than burning sulphur. This may be done after office hours, the fumes allowed to remain over night, and the room thoroughly ventilated for an hour or more in the morning. Sulphurous acid gas, of course, tarnishes silver, and has strong bleaching properties, and when about to use this agent, one had better bear this in mind, and govern himself accordingly. Advantage may be taken of house cleaning time, when drapery, furniture, and pictures, are removed, to thoroughly disinfect by burning a large quantity of it, say a pound or two, according to the size of the room or rooms. To do this with absolute safety, the iron vessel containing the sulphur should be set on a brick in a bucket of water. Of course, the air, charged with such a quantity of this gas, is highly poisonous, and it will be well to have a window slightly raised, so that the fumes may be somewhat dissipated by morning. Opening the doors and windows, for at least half an hour before beginning the work of the day, should be a matter of rigid daily observance—*III. Trans.*

TOOTH STRUCTURE.

J. G. PALMER. NEW BRUNSWICK, N. J.

Let us glance at the tooth structure, and the relation the pulp bears to the dentine. What is the pulp? It has been described as the "soft vascular part of the tooth within the central chamber," which, though true enough, does not give a definite idea of its relation to the tooth, nor how it became placed within its sheath of dentine and enamel. From without, inward, we have enamel, living membrane, dentine, pulp. The enamel is dense and hard, the dentine somewhat softer, the pulp very soft, being composed of capillary blood-vessels and nerve filaments, held in the meshes of connective tissue, which nerve filaments enter and ramify the tooth structure.

It is not my intention to describe in detail the formation, "in embryo," of the teeth, for we are, or should be, more or less familiar with it. But I desire to refer to some of the changes that occur.

While the enamel is being formed from the enveloping sac, at the proper period, begins the formation of the dentine from the papilla, or tooth germ itself. As this formation progresses, the papilla is encroached upon, and grows smaller and smaller, as more dentine is formed from it, until the point of completion is reached, when by some law of nature, the process ceases, and the dentine being completely formed, we have a cavity within, filled with a highly sensitive pulp, the "soft vascular part of a tooth" mentioned before, which is the remainder of the papilla, and consists of blood-vessels and nerve filaments, similar to the ordinary papilla of touch. During this time, the formation of enamel has progressed, and the tooth being completed, in due time we have its eruption.

The enamel, dense and hard, is built up of bundles of rods, called "enamel rods," which hold a very small quantity of living matter in the interstices between them. Some eminent microscopists and observes aver finding this living matter in direct contact and communication with the dentine at the living membrane of the tooth, and the name, "enamel fibers," has been given to this substance. In the dentine we find canaliculi, or canals, or dentinal tubuli, or tubes, which it is certain contain "dental fibers" which are offshoots of the pulp, and establish communication from the pulp to every part of the dentine, and in all probability, throughout the enamel also. Necessarily then, any exposure of the nerve, even congestion without its exposure, may result in its death, and the removal of all living matter from the dentine and enamel; and we know that such teeth are more brittle than living teeth.

I have said that the dentine was formed from the papilla, or pulp. It has been found that as old age comes on, the walls of the pulp-chamber seem to encroach upon the pulp, which grows smaller. Evidently, new dentine, or something akin to it, is formed from the pulp, as at an earlier period. Sometimes excrescences will be found within the pulp-chamber encroaching upon the pulp. This new formation is called "secondary dentine," and it is certain, that under favorable circumstances, it will be formed from the pulp. If then, the papilla could build up the dentine, and if, in after years, it has still the power of producing a bony formation, in the shape of secondary dentine, it certainly has the power of building up new material after exposure, if properly cared for. It is now generally admitted that it does possess this formative power, and in so much, the conservative treatment is certainly feasible. As to the method: The exposed pulp must be carefully protected—put into a healthy condition if need be, so that it may build up this layer of secondary dentine.—*N. J. Transactions.*

To Remove Tartar, is not so difficult as to prevent its deposit. Calculi are found in all parts of the body, especially where a foreign body is presented for a nucleus. I doubt the truth of the statement that the trouble is more prevalent in limestone region than others. Calculus is not only found in the mouth, but also in the bladder, testicles and tonsils.

DR. C. R. TAYLOR STREATOR, Ill.

What is Conservative Treatment? what does it mean? and what is it opposed to? are questions likely to be asked concerning such a subject. Webster defines the word conservative as meaning, among other things, "to save, to protect—that which keeps from injury or RADICAL change." Consequently it signifies more than the word "preservative," and hence the "conservative treatment" in dental operations, must signify more, embrace different treatment, and secure different and more complete results, than that which is designated simply "preservative."

In speaking of the treatment of the pulp, we necessarily presuppose its exposure, or injury in some way, thus giving rise to a need, either of treating it or of destroying it, and the "conservative treatment" means its preservation if possible, as opposed to its devitalization, which may properly be considered the "radical treatment."

DR. J. G. PALMER.

The periosteum.—Outside of the tooth is the periosteum. This membrane is very vascular and exceedingly sensitive. From its attachment to the root of the tooth, its fibers run in an oblique direction toward the crown of the tooth, to a point of attachment to the side of the socket. By this wise arrangement the tooth is always suspended in a sort of sling, so that, in biting, the fibers stretch, and as soon as the pressure is relieved they contract again, giving the tooth more or less of an up and down motion in the socket. But for this wise provision of nature, if our teeth were solidly held in the jaws, we would probably become toothless much younger than we now do, as we would break them to pieces in biting any hard substance.—DR. FRANK ABBOTT.

The process of decay.—We will suppose, for instance, that we have a sound portion of tooth, opposite a cavity of decay. We will deposit upon it a certain amount of food or any substance which would tend to produce either lactic, hydrochloric, sulphuric, or any acid that would have an affinity for the lime-salts of the tooth. The food, constantly fermenting and forming acid, is kept for a long time in contact with the surface of the enamel, eventually a solution of the

lime-salts of the surface begins. The next step is an irritation of the living matter of the enamel. The next is an inflammatory reaction of the contents of the canaliculi, or canals, and a swelling of this substance, which displaces the lime-salts; then a return of the organic portion of the enamel to the same condition it was in before the lime-salts were deposited, *i. e.*, its medullary or embryonal condition. Upon the surface of a decayed spot the lime-salts are washed or dissolved away by the action of the fluids of the mouth, or acids. They both probably play a share in their removal. When the inflammation reaches the dentine it increases in intensity in proportion to the amount of organic matter in the dentine as compared with the enamel. The acid (always present in a cavity of decay) being the constant irritant, probably assisted to some extent by the micro-organisms found in such great numbers and which feed upon the decomposing organic substance.

It is generally understood that when living tissue becomes inflamed, it changes from its organized condition to the condition it was in before it was organized for its special purpose, *i. e.*, its embryonal or medullary condition. In caries of the teeth the same changes take place, as I have before stated, the only difference between inflammation of soft tissue and tooth substance being, in caries, the melting down of the glue giving basis-substance and the dislodgement of the lime-salts by the swelling of the living matter. Caries of cementum is the same as that of the dentine, differing only in its rapidity. There being more organic matter in the cement, the inflammation extends more rapidly and the tissue is destroyed faster.—

DR. FRANK ABBOTT.

Tobacco Manufacture in New York City.—She has nearly 4000 and turns out 1,000,000,000 cigars a year. Pennsylvania, Ohio and Illinois rank after New York. There were made in this country last year 3,177,860,952 cigars, about forty for every pound of tobacco used. About 35,000,000 were imported, thus making a total of about 3,150,000,000, or sixty for every man woman and child in the United States, and 250 for every man over 21 years of age.

Lime water and milk, so strongly recommended by Mrs. M. W. J., in *A Mother to Mothers*, on another page, may be taken, or may be given to children, too freely. Every good thing can be abused. We have known serious ill results from its use.

For a temporary filling beeswax and rosin is good and cheap. Make it of the consistency of good chewing-gum—about 1 to 4.

THE DECADENCE OF THE AMERICAN FAMILY.

EDITORIAL.—MEDICAL RECORD.

We do not like to be doleful, but it is impossible to ignore some of the facts that have been presented within the last year or two by Dr. Goodell, Dr. Nathan Allen, and others. These facts relate to an alleged change in the physical organization of our men and women, and to the decadence of family life among Americans. Dr. Allen, who has been studying this subject for many years, presents the case very directly in an article entitled "The New England Family" (*The New Englander*). It is asserted that the objects of the institution of the family are three : the propagation of children, the preservation of chastity, mutual help and company. In each of these respects the American family, especially the New England family, shows a marked and progressive deterioration, since one hundred years ago.

As regards the propogation of children, it is shown that the average native New England family is very much less productive than formerly. This, we are told, is due not alone to the induction of abortions and the prevention of conception, as was at one time asserted, but to a change in the physical organization of the parents. Individuals in whom the tissues and functions is not well preserved are less fertile. The very nervous, or the very lymphatic temperaments accompany a lessened reproductive power. The tendency of the age is to a one-sided, intellectual cultivation and undue and artificial development of nervous tissue ; hence a comparative sterility. The birthrate in New England families has been steadily declining until now it is lower than that of any European country except France. One additional element in this, no doubt, is the habit of delaying marriages—a habit made almost necessary by the more expensive style of living which is demanded, and by what some consider the selfishness of young men who prefer not to sacrifice their liberty to the responsibility and expense of domestic life.

Another indication of family deterioration is the increase of divorces. These were rare a hundred years ago, now they number one to about twelve marriages in New England, while among our foreign populations, who are less educated, and even less moral, the ratio is one to forty or fifty.

Many evidences are brought forward to show that marriage does not accomplish all that it has done or ought to do in preventing adultery. The frequency of the charge of adultery in divorce suits is great, it being made in about one-third of the cases. The increase in late marriages, which leave many more of both sexes exposed to

temptation, is an undoubted factor in the alleged increase of licentiousness.

As regards the third object of marriage, "mutual help and company," our author alleges the decrease in the number of marriages, the modes of life and business by which men are kept away from their homes, turning their whole energies in every direction except the making home pleasant. To the New York, as well as New England business man, home is often only a place to eat and catch his breath in during the intervals of business. It is also alleged that New England women are losing their love of offspring and home.

The family life of the American, therefore, according to the above indictment, occurs more rarely, begins later in life, is blessed with fewer offspring, is accompanied with less happiness and less fidelity; is, in fine, less of an institution than formerly. The more artificial attractions of this world have supplanted it.

Dr. Allen's remedy is in an attempt to revive the family spirit. As the foundation of Church and State, as the institution by which good citizens are made, its preservation, he truly asserts, should be jealously guarded. The clergyman and moralist, the statesman and, by no means least the physician are urged to use their influence to prevent this physical and family deterioration, which, although perhaps exaggerated by some, unquestionably exists.

COVERING OXYPHOSPHATE, AND LINING CAVITIES, ETC.

EDITOR ITEMS:

On page 236, May issue it is stated that there is nothing better than gutta percha varnish to cover an oxyphosphate filling whilst hardening, and its use as a lining to cavities is referred to. So far as my own experience goes it is of very little if any value for either purpose, owing to its doubtful adherence to most surfaces, tearing itself loose frequently by its own irregular contraction. For the two purposes specified there are two varnishes which are absolutely reliable, one a solution of roasted gum copal in ether 720, the other is a pasty mixture of bees wax and chloroform. Both these adhere to any surface beyond the possibility of separation and both are water-tight while they are in a perfectly soft and sticky state. The bees wax varnish has the special advantage that it does not penetrate below the surface of fillings before they are hard and so prevent proper setting. A solution of common rosin in ether has to a great extent the same properties as copal, but owing to its permanent surface stickiness it is liable to be removed mechanically in a much shorter time than either of the other varnishes mentioned.

THOS. FLETCHER, F.C.S., Warrenton, Eng.

Editorial.

DR. BARRETT INDIGNANT.

In the June *Independent Practitioner*, the editor "goes for us heavy." He charges that much of our journal is compilations from outside sources ; that we often resurrect articles, or quote from articles, long since published ; that we sometimes quote from journals or authors without giving them due credit ; and that we "erase the owners name, change its form a little, paint it over with another color, and then stoutly claim it as his (our) own."

The first and second charges we humbly admit. We do glean from all available sources, at times quoting articles or parts of articles published in former years. Dr. Elliott on "The Eye," and on "Thoroughness in Dental Operations;" Dr. Chase on "Circulation in the Dental Tissues, on "Dental Specimens for the Microscope," and on "Deciduous Teeth;" Dr. Boynton on "Truth and the Profession," "Yeast," and "Fermentation," are specimens. We think those who have read them will agree with us that they have lost none of their value by age. *But*, when the article is of such a nature that there is a possibility of a change of sentiment in the author, it is our rule first to correspond with him on that point.

The charge that we quote from journals and authors without giving them due credit is true in isolated instances from inadvertance ; but we aim to do justice to all. In the thousands of items of interest we quote from long articles or from still longer discussions, it would be strange if some instances could not be found in which we omit the authorship. In reprinting longer articles it is our rule to add the journal to which it was communicated, or the society before which it was read. And if there is any evidence that the paper or society's proceedings we quote were specially procured by a journal we add this fact.

Dr. Barrett says we have an article in the March ITEMS which should have been credited to the *Independent Practitioner*. In referring to this number, we presume he alludes to that of Dr. Timme, which we credit as "Extract of Paper read before the Central Dental Association of Northern New Jersey." We suppose we ought to have added from the *Independent Practitioner*. His citation of Dr. Crittenden's article on Dentition is in point. We did not give its source—

that is, the Society before whom it was read. This was attached to the article when passed to the printer, but omitted by him without our observing the omission.

Dr. Barrett, you are mistaken in saying we credit Dr. Welchen's article to the District Dental Society of Rochester." Look again, and you will see it credited to the "District Dental Society, Rochester"—that is, this was a paper read before that Society at its meeting in Rochester. Of course, you did not intentionally change our phrasology so that you could say there was no such society ; but perhaps it shows that we can all make mistakes. Again, you charge that it appears in our columns as original matter, when its quotation is distinctly stated.

As for the last charge, that we appropriate to ourselves as editorial what we should credit to others, we simply say it is not true. The editorials in the ITEMS are all our own. There are no articles—editorial or otherwise—which are presented in any disguise.

The deprecatory allusion to our efforts to lessen the use of tobacco in the profession, and styling our columns as "narrow pages," of course, only shows the mood in which our esteemed cotemporary wrote, and yet we thank Dr. Barrett for his criticism, and hope it will do us good.

"We editors" all have our troubles, and often feel like thrashing one another. There is scarcely a month that we do not find in our exchanges one or more of our editorials without the proper credit. For instance, our editorial on *The Manipulation of Oxyphosphate* in the March *Items* was quoted by three American and one English journal. One honors us by making it its own editorial; and another quotes it as an editorial from that journal. The English journal is the only one which refers to it as our editorial.

DENTAL NOMENCLATURE.

There is great need for definite, intelligent and extensive work in this direction. Who will undertake it? Harris did a good work many years ago ; but what was praiseworthy then is very incomplete and defective now. The educational growth of the profession, especially during the last ten years, has demanded and received many new names and terms which the mass of the profession do not comprehend ; and there is necessity for others, which should not be left for chance or ignorance to devise.

In Heintzman's new work there are a large number of terms, made necessary by the advanced thoughts there brought forward, but which have never received a definite definition. We suggested to the author, while the work was in press, that a glossary should accompany it, but our suggestion came too late.

But it is not the apprehension of new truths alone which demand definite names. There is confusion and a want of intelligence and fixedness in the manner of expressing many things that have been common since the infancy of our profession. Take, for instance, the names of the teeth and their various aspects. The central and lateral incisors are good names; the cuspids, and the first and second bicuspids are good. But why tolerate the custom (in vogue with many intelligent dentists) of calling the cuspid an "eye-tooth," a "stomach tooth," and a "canine"? Is not cuspid quite good enough? Then let that be its name. We are glad that the English word "pre-molars" for bi-cuspids has not been adopted in America. One name for one tooth is enough, and let bi-cuspid be that name. And are not first, second and third molars good enough for the main grinders? Then let us ignore "six-year-old molar," and even "sixth-year-old molar; and also "wisdom-tooth" and *dens-sapientia*.

Are not the terms upper teeth and lower teeth definite and dignified enough to designate the teeth of the upper and lower jaws? Why, then, call them "superior" and "inferior," which really expresses what we do not intend?—for the upper teeth are not superior to the lower teeth either in position or quality.

Then, in regard to the aspects of their various surfaces. The word mesial is a rather hard word for the uninitiated; but just remember that it refers to the middle of the mouth, with reference to the right or left side, and you will not be confused. The mesial line is an imaginary plane dividing the head, neck and trunk into similar halves, toward the right or left. The aspect or surface of a tooth toward this line is, therefore, its mesial aspect. Its opposite surface is its distal, or distant surface. Now, if this is sufficiently distinctive, why not adhere to these terms for those two surfaces? So with the lingual, or tongue, surface; and the labial, or lip, surface. Let us have these and nothing else, and then there will be no confusion or misapprehension of meaning. But there are some other parts of a tooth sometimes necessary to speak of. Thus we have the approximal surface, or that aspect approaching the surface of the next tooth; and we sometimes speak of the cervical wall of a cavity, or that next to the gum, as the most difficult to secure from after disintegration.

We merely speak of these few terms as specimens of the necessity for definiteness and unity of expression. Who will take up the whole subject, and give us what should be the foundation for a good Dental Lexicon?

Unslackened lime is said to cure hypersensitiveness of the teeth. When we were in dental practice we used it to a very limited extent, but not enough to report intelligently. Dr. Calvo and Dr. Yarini of Cuba, say they have found it quite beneficial.

Just break up a few lumps coarsely, and put in a tightly corked salt mouth bottle. When wanted, pulverize finely one of these pieces, and place upon the surface to be obtunded; cover with wax. It will produce some pain but this will soon pass away. Its effects does not penetrate very deeply, but it leaves the exposed surface in a nice condition.

THE TEETH FROM A MEDICO-LEGAL ASPECT.

The identification of dead bodies and criminals is sometimes a matter of much perplexity. The features of a dead body may be distorted or destroyed; the clothes changed or unrecognizable; and no ordinary circumstance left to make identification clear. Some such a case occurred in Michigan. A man was found in a lake murdered. As the coroner was about dismissing the case as "unidentified," the neighboring dentist had the curiosity to look in the mouth. In a moment he said, "I have a chart of that mouth in my office," and though he could not then remember the name, he soon found it by referring to his chart book. It resulted in tracing the murderer.

The celebrated trial of Prof. Webster dragged its slow length along till his victim's artificial teeth on a gold plate was found where the body had been dissolved in acids. The dentist who made the teeth, after proper reference to models said: "These teeth are Prof. Parker's;" and it was a thread which led to other and sufficient evidence to convict the murderer.

"If you saw the man who bit that orange, would you be able to recognize him?" said an officer to me once. A robbery had been committed, in a house, and the robber had bitten into a hard sour apple he found on the center-table, and had then thrown it on the floor.

"Yes, I think I could," we replied; and I believe I can so describe him to you that you can identify him. He has large upper central incisors, the front edge of the left one is turned out a little. The left lateral is gone and the right lateral is twisted nearly half-way round. That man I believe was in my office a month since and had a little work done. Let me refer to my chart book.—His name is Mr. _____, and I filled three _____."

"But Doctor," interrupted the officer, "the young man you name is entirely above suspicion. It can't be him."

But it proved to be him, and he was sent to States prison for the offense.

Great Talkers.—We have many in attendance at our Dental Conventions who are too diffident. They ought to be encouraged to take a part in discussions and in essays. There are others "who," to

use the words of another, "make it a point to inflict their remarks upon all, whether they know anything upon the subject under discussion or not. Very often they speak the veriest nonsense, and thoroughly succeed in disgusting those who have come for the purpose of saying something either new or interesting upon the subject presented. It is entirely unnecessary to mention names here, as the individuals who speak merely to hear themselves, and to acquire a little cheap notoriety, are well known to all the regular attendants."

Iodoform is one of our best non-irritant antiseptics, and therefore, admirably adapted to the treatment of exposed tooth-pulps; also as an antiseptic for pulps that are dead. This property makes it a very acceptable germicide—perhaps it has not its superior. Some who have not used it suppose its odor specially objectionable, but it is no more disagreeable than most drugs. It may be used either as a powder, made into a cream with creasote, or dissolved in ether; the addition of a little eucalyptus oil improves it. A small amount in either form will suffice. As a covering for a live, exposed pulp preparatory to a filling of oxyphosphates, the paste will, we are confident, be found good. For this purpose, perhaps the powder mixed with a thick mucilage of gum arabic would be quite as good as with creasote. J. Morgan Howe, M. D., of New York says that, as a preventive of pericementitis, and other troubles so often following the treatment of dead pulps, it is sure. We all know that this class of cases is among our most difficult to treat. It would seem, when a pulp has been dead for a long time—perhaps dying years since under a filling encroaching upon it too closely, or by some violence to the tooth, that its mere after exposure for treatment could not possibly be the cause of any disturbance to the tooth; and yet practice proves them very uncertain things to treat. Fermentation sets in, and trouble follows. Dr. Bödecker of New York was, perhaps the first to suggest iodoform for the remedy, or rather as its preventive, and it proved very efficient.

The use of oxy-phosphate as a foundation in large fillings is preferable to all gold fillings. Even where the principal part is oxy-phosphate, and this is plated with gold, there is much less danger of breakage of the frail walls than with an all-gold filling. The plastic is also a better non-conductor, makes a more impervious filling, and is a better protector against thermal changes and disintegration of the tooth. As Dr. Atkinson says, "All we need gold for is to restore the contour of the tooth, and to offer a better resistance to chemical agents and mechanical abrasion. This is accomplished by first filling the tooth with oxy-phosphate, and then cutting this back to get good

retaining points and grooves, and sufficient space for plating with gold, so that all the exposed surface will be covered by it." Where the tooth is not exposed to view, alloy is quite as good as gold. But in all these cases of plating over oxy-phosphate, thorough work must be done, or time will show it to be among our poorest efforts.

Carbolic acid crystals dissolved in glycerine, says Dr. McKellops of St. Louis, is one of our best applications to the necks of teeth for the removal of the remains of tartar after the instrument has been used.

An accumulation of tartar is not scurvy;—and yet we often hear patients, and even dentists, speak as though these were almost synonymous terms. Scurvy is rarely found among any but sailors, or those for a long time on the salt water deprived of fresh vegetable food. The symptoms are very different from the effects of tartar.

To remove tartar from a plate of teeth it is unwise to scrape as this removes the polish, makes the surface unpleasant to the tongue, and causes the tartar to gather still more rapidly afterward. It is easily removed with a tooth-brush moistened with any strong acid—muriatic or sulphuric is good. Or leave the plate over night in a weak solution—say 5 or 10 per cent.—of carbolic acid. In either of these processes the plate will be found smooth, sweet and uninjured.

Watt's Crystal Gold was under discussion at the last meeting of the New York Odontological Society. We are pleased to see by this report and others that so many of our foremost operators are using it, and so highly recommending it. We used it for many years—exclusively for the last fifteen years of our dental practice—and was much pleased with its soft, waxy, cohesive properties. Its use needs experience, of course, as does all other preparations of gold. For instance, we found good retaining points useful, to be thoroughly packed as the nucleuses for the mass of the filling. Thick pieces should not be used, especially at first, and never so large as to need crowding through the orifice of the cavity. Each piece should be placed to its position carefully, and, at first, pressed lightly. Most of the points of the instruments should be finely serrated but not deeply, and their surface should not be large. The best form is the foot, and a very few points are necessary for all operations. The most serviceable one for all, especially for lateral and small cavities, is the small smooth foot.

Carbonate of soda for cleansing putrid teeth is quite good. By its use the offensive odor is almost immediately neutralized. Tooth-

ache from an exposed nerve may be stopped very quickly by it; and it acts nicely to obtund hyper-sensitive dentine. We do not refer to the common baking soda (bi-carbonate), but to the crystal washing soda. A few grains put in the root, and sealed up for two or three days, will dissolve any remaining dead pulp, saponify putrid matter, and present a clean canal quite in contrast with what is often found after other treatment. If the foramen is open, it will go far in curing ulceration, and in breaking up an abcess. To obtund hyper-sensitive dentine place a small amount, pulverized, in the cavity, and seal up with a soft preparation of gutta-percha, or beeswax and rosin, for a day or two.

Can lost alviolus be reproduced? is a question now discussed in many of our societies. Dr. W. H. Atkinson of New York says yes, and so do many of our best practitioners. Most of our standard authorities—perhaps all—say no. The observations of many dentists, who have carefully cleaned loosened teeth and judiciously treated them, will confirm Bro. Atkinson's yes. We think aromatic sulphuric acid has done much good in this direction. We are in hopes to be able to publish in our next issue an article from Dr. Atkinson setting forth his observations and practice.

Tooth-decay is more generally caused by lactic acid. The effects of acetic acid is nearly similar to lactic.

Chewing Gum is generally condemned, but it is often servicable in cleaning the teeth and in giving them firmness. Our food is too soft. In consequence, the teeth are often covered with a sliminess which invites fermentation, and their want of exercise causes flabby, loose gum around their necks, and an absorption of the alviolus around their roots. The use of a good tooth brush will do much good, and hard food and thorough chewing still more. Where the food is not hard, and its chewing is not vigorous, a short time use of chewing gum has its good effect, not only on the prominent surfaces of the teeth, as with most tooth brushing, but in the interstices. When a physician, we sometimes recommended chewing tolu for a while and then swallowing it. It has a grateful, sweet, spicy taste, and its effects on sluggish kidneys is admirable. Such chewing arouses the dormant salivary glands and is thus beneficial to digestion; of course, the custom may be carried to excess. The nasty, vulgar and injurious habit of tobacco chewing is often excused on the ground of the cleansing effect it has on the teeth, and the firmness it gives them. Chewing a piece of their wife's mop-rag would be more cleanly both to themselves and to the floor of the room in which they exercise their teeth.

Success in Life.—It is the ambition of every person to make a success in life, but there are many different opinions as to what constitutes success. Many men die leaving the world with the impression that they succeeded wonderfully, when in reality their lives have been most miserable failures. It is not always an evidence of success because a man accumulates a fortune and dies rich, nor is it evidence of failure because another man lives and dies poor. The poor man may have done more good in the world and enjoyed himself better than the rich man. There is no more lamentable illustration of a life failure than the career of the man who devotes all his energies to making money, who instead of enjoying the fruits of his labors, continually struggles for a "little more," thereby ruining both his health and his capacity for enjoyment, who lives an anxious, fretful life, and dies a premature death having accumulated a fortune without ever enjoying it. It is not so much a person's ability to turn his occupation to account in making large sums of money that constitutes success as his faculty for getting a large amount of enjoyment and doing a great deal of good with a moderate income.

Intellectuality counts more in the scale of womanhood in America than it does in England, says Mr. Hatton in Irving's book upon his impressions of the United States. "It is easier for a clever woman to excite the admiration of her sex in America than in England. A woman who adorns and lifts the feminine intellect into notice in America excites the admiration rather than the jealousy of her sisters. American women seem to make a higher claim upon the respect and attention of men than belongs to the ambitious English women, and when one of them rises to distinction they all go up with her. They share in her fame. They do not try to dispossess her of the lofty place upon which she stands. There is a sort of trades-unionism among the women of America in this respect. They hold together in a ring against the so-called lords of creation, and the men are content to accept what appears to be a happy form of petticoat government.

Dr. Farr, an English scientist says that if one could watch the march of 1,000,000 through life the following result would be observable. Nearly 150,000 will die the first year, 53,000 the second year, 28,000 the third year, and less than 4000 in the thirteenth year. At the end of forty-five years 500,000 will have died. At the end of sixty years 370,000 will be still living; at the end of eighty years, 97,000; at eighty-five years 31,000, and at ninety-five years, 2100. At the end of 100 years there will be 223, and at the end of 108 years there will be one survivor.

Miscellaneous.

THE EYE.

BY W. S. ELLIOT, D.D.S., M. D., NEW YORK.

Nerves are the media of transmission common to all the senses—to sight and to hearing, to smell and to taste, and we can discover no difference in their structure, either microscopically or chemically. Then, to what shall we ascribe the marked difference in the nature of the sense? Presumably, first, to the nature of the excitant; and, second, to the peculiarity of the apparatus which serves to co-ordinate the excitant. Thus the impingement of odoriferous substances upon the olfactory ganglion gives rise to the sense of smell, and the vibrations of the atmospheric air upon the auditory fibers gives us hearing. The one evidences the chemical nature of the excitant, and the other the mechanical; and no reversal of order would suffice to demonstrate the character of the phenomena.

The vibratory action of light will not function the sense of taste, neither will sound agitate the sensory tissues of the eye.

I desire now to ask your attention to the structure of this important organ, and I think you will be able to follow me and come to a still higher appreciation of the science which reveals to us the laws governing the wonderful phenomena of physical life.

Within the depressions of the cranium are the apparatuses placed, being almost entirely surrounded, posteriorly and laterally, by bony walls, which afford proper protection to the delicate tissues contained within. The sockets are made up of sectional parts, the hard names of which I will not burden your memory with. Suffice it to say that they are seven in number, and at the apex of each conical receptacle are two openings called foramina, which transmit vessels and nerves to the brain. The eye-ball itself is composed of many tissues, to which we will call your attention in their proper order. Upon its outside is a dense fibrous membrane analogous in its uses and relationship to the rind of an orange or the coat upon your person. It is exceedingly tough, and in its degree of vitality it is but a little removed from that of its bony surroundings.

If you will look into the eye of your friend, you will see a portion of it, and it is that which you have been pleased to call the "white" of the eye. Physiologists have named it *Schlerotica*, or

schlerotic coat. Remember, this is not so delicate and sensitive a structure as one would imagine. It is really a protective covering, and therefore is void of those elements which would make it respond quickly to injury or irritation. Next within this is a very different membrane—different in color and sensibility, and different in its office. The schlerotica being white, this is black, or nearly so, and it is incapable of reflecting pure light. It is called the choroid. The shade, however, is not, in all cases, of equal intensity. There is a difference, proportionate to that which you will observe in looking into one's eyes, and pronouncing them light or dark. A prominent exception is manifest in the case of Albinos. Here the pigmentary substance is absent, and the membrane cannot perform the function assigned to it under normal conditions; hence arises the difficulty of vision experienced by this class of persons. In old age, too, there results a reverberation of the rays of light within the eye through a partial wasting of this pigmentary material, exaggerating the otherwise growing impediments to correct vision.

The photographer would find it difficult, if not quite impossible, to concentrate the rays of light upon the side of his camera did he not heed the physical laws governing the process, and copy nature by painting black the lining surface of his instrument.

The next layer of tissue within the globe of the eye is the retina, a most complicated organ, and one that must excite your interest and admiration as you come to know its peculiar mechanism and function. It is a transparent membrane, and is the one upon which is spread the terminal fiber of the optic nerve. The rays of light, after having passed through the various lenses, is received here—and here, by the most mysterious process, they are transformed into sight.

Histologists have sought earnestly to reconcile the complicated structure of this tissue with the visual sense, and much has been ascertained to assist us in our researches. Although the optic nerve is spread out upon this membrane, it would be an error to say that the fibers were primarily acted upon by the light rays; but we may not understand this until we have proceeded further in our investigations.

The retina is not a homogenous mass, but under the microscope appears divided into strata, the layers of which possess special characteristics, and to each of which is doubtless assigned a special function. Much obscurity, however, still obtains regarding this subject, and the world regrets the demise of the most accomplished investigator of modern times, Max Schultze, who died in 1874. To him is assigned the honor of settling many disputed questions which for a long period were exceedingly puzzling and unsatisfactory.

By the assistance of the ophthalmoscope the retina presents the following appearance: the color is reddish, and the surface is plainly

traversed in a somewhat tortuous manner by numerous blood vessels which emerge from one common center—the optic disk—and extend in various directions toward the periphery. At a point directly in the line of axis of the globe is a distinctive spot, called the *macula lutea*, or yellow spot of Sommering; here the membrane suddenly diminishes in thickness, and at this point becomes the most sensitive portion.

The entire surface is also covered by nerve filaments (but imperceptible except through the microscope), which are the terminal ends of the optic. After distribution they penetrate again the membrane, and finally end near to or upon the surface of the choroid.

There are at least eight layers; the lower and filamentous one we have already spoken of, from which proceed certain cell formations known as ganglia, then reticulated and straight fibers, then again cells and fibers until we reach finally the layer of rods and cones which together we designate Jacob's membrane. It is at this point that the act of vision seems to be consummated, or rather where the excitant, whether it be the luminous rays or other agent, actuates the true perceptive elements. As before stated, the yellow spot is the most sensitive to external influence, and from this fact it becomes of special interest to the histologists, and more particularly since this exists only in man and the quadrupeds. If we carry our observations to this point we will notice a considerable disparity of proportion between the various layers, and this is particularly so in the human eye. You will perceive as we approach the macula lutea and enter into its more central portion, the tissual layers diminish in thickness and the elements of some of them entirely disappear, while others again are increased; the latter is confined to the cones, which become far more numerous and occupy quite exclusively the territory of Jacob's membrane. This fact leads to the conviction that the cones are the elements of the keenest perception, which view is otherwise confirmed by comparative anatomy. In the ape much the same condition exists as in man, but in mammals of more nocturnal habits the rods take the place of the cones. It is supposed that the office of the rods is to take cognizance of the quantity of light and the measure of distances, while the cones have the power of analyzing the light and taking perception of its constituent colors. Color blindness may, therefore, be reasonably attributed either to the deficiency of the cones or to some pathological inability to respond to the excitant. As already stated, nocturnal mammals are possessed of only a limited number of retinal cones, since there seems to be no special need for the assimilation of the chromatic rays. This is the case with the cat and rabbit.

The bat, hedgehog and mole, the eyes of which are exceedingly small, have no cones; the fishes which are born and live in the waters running through deep, dark caverns, it is said, have no eyes at all, or

only rudimentary ones at least, and animals that are born with closed eyes have neither rods nor cones until their eyes are open. The night birds have rods but no cones; they have the power, therefore, of appreciating the quantity of light, but not its quality. The day birds, on the other hand—especially those that live on small insects of brilliant colors—possess, in proportion, a much larger number of cones than man or other mammalia.

The tuco-tuco, a burrowing rodent of South America, of more subterranean habit than the mole, is frequently entirely blind; and many animals which inhabit the caves of Styria and Kentucky are also without the power of vision.

In considering the subject thus far our interest has concentrated upon the remarkable structure and function of the retina. And especially have we noted the peculiarity of the yellow spot of Sommering. This, as before stated, is placed immediately upon the line of axis, and since this is found to be the most sensitized portion, it is correctly inferred that in proportion to the distance from this central point does the reflected image fall, so is the sharpness of vision obscured. While this general statement is true, there is one existing spot which is entirely destitute of visual power. And, curiously enough, this is directly upon the optic disk, the place of the entrance of the optic nerve—only one-tenth of an inch from the yellow spot. That this is true may be demonstrated by a simple experiment, and which any of you may verify. Upon a card, say two by six inches, make two dots or crosses, with ink, about four inches distant from each other; close the right eye, and direct the left eye to the cross upon the right end of the card as it is held horizontally in the hand, and slowly move the card from a distance toward the eye; at first both crosses are distinctly seen, but as the image of the one on the left passes over the optic disk, it is immediately obliterated.

This is a further illustration of the functionary power of the several membranes of the retina, and the incapability of the nerve itself to co-ordinate the impression; and the fact is made still the more apparent when we take into consideration that the optic fibers do not at all encroach upon the yellow spot.—*Den. Miscellany.*

THE ORIGIN OF ORE.

The following extracts are from a lecture by Prof. John A. Church delivered to the pupils of the public schools in Tombstone, Arizona :

No one has ever seen ore in process of formation, but something has been learned of its formation, and I will try and tell you how it is deposited in Tombstone. In the human frame there is a circulation,

of blood passing from the heart through the system and back to the heart. In plants there is a circulation of the sap ; the earth has its circulation—water comes to it, passes through it, and rises again to its surface in the form of springs. The first thing to be observed is the rainfall passing into the rocks. Rain penetrates more than twenty miles into the crust of the earth ; it dissolves substances—ore as well as sugar. When we wish to extract the silver, we add salt and bluestone ; every substance can be dissolved in the water, even the quartz ; limestone is readily dissolved. Rain water in passing through the earth takes up minerals—lime, iron, potash, etc.,—which are deposited in the interior of the earth, and then return again in the form of springs. The rainfall is pure, but the springs are not pure, for they have taken up these mineral substances. Air also circulates in the earth ; it takes up oxygen and nitrogen. When these combine with a solid rock, the rock is said to be hydrated. This air is passed upward through the rocks as the water passes downward. These form springs.

In addition to water and gas, the earth has a circulation of solids ; sea waves beat on the rocks and wear them away—where those particles are coarse, we have pebbles ; where smaller, we have coarse sand ; smaller yet, mud, portions of limestone. Sea beaches are found in the mines of Tombstone.

When these particles are first worn off they are borne away—the finest particles borne far away, and called shale. In the mines of Tombstone are found limestone, quartz, and shale ; which proves that where we now stand, on the hills of Tombstone, it was once deep water.

This history of a rocky sea cliff is the history of a whole world. The world was originally composed of gas, much heated and then cooled, like the volcanoes of the present day, where the top goes to the bottom and the bottom comes to the top.

No one has seen the original earth. It cooled gradually from a gas to a solid. In this way the chemist tries to obtain pure water : He takes water as pure as he can find it, heats it, then cools the steam and repeats the process until he gets a pure water. In this way quicksilver is purified, and camphor gum. So a gas will condense into a solid, and a solid may be heated until it becomes a gas.

This earth was once a gas, heated and then cooled, until it became a solid. It is by these circulations of water and air that the ores are collected together and found in one place. If we were to see the original earth, unacted upon by the circulations which I have attempted to explain to you, we should find the quantity of metals in rock very, very small.

At Comstock Lode, Nevada, are found volcanic rocks which

contain 55 per cent. silver, and gold 45 per cent. So in the eruptive rocks of Leadville, Colorado, the proportions of gold and silver have been found to be similar. The geologists have been able to show how many tons of rock must have been dissolved to give this per cent. of precious metal. The waters found holes, or crevices, where they could deposit the metals they had taken up, all of which are not deposited 3,300 feet or one mile below the surface of the earth, so that mining for these metals will not be carried any farther than one mile below the earth's surface, though the water penetrates 20 miles into the earth; the deeper the water goes the more the pressure, and when you increase the pressure you must increase the power of solution; releasing the pressure also releases the metals; the waters passing through the rock are forced now slowly, now more rapidly, and when such waters reach the crevices there is much less speed of the waters, and the metals are deposited there. In regard to the depositions of ores, scientists show us that the rocks have been acted upon again and again by water, and in this way the ore is collected. It is difficult to distinguish the age of the rocks, but they have shown where the first concentration of the metals in the oldest rocks known gave a yield of only one-half cent to the ton. The part of the circulation which collects metals is called the function of the circulation.

No one knows why the precious metals are deposited in veins or in beds; but one thing can be shown—that where these ores are found there are eruptive rocks. In the western part of our country this is especially true.

Where not only shales but dikes are found, where melted rock has been forced to the surface, but by the action of water has been carried beneath the surface, which shows eruptive forces at work, so it is in the hills of Tombstone—forces as simple as the ordinary forces that work in every housekeeper's kitchen or chemist's laboratory.—*Republican.*

COCOANUT, AND WHAT BECOMES OF THE SHELL.

Messrs. Warner & Merritt claim to be the largest cocoa nut importing firm in the United States. Last year their importations footed up 16,000,000 nuts, and Mr. Merritt states that they have already concluded a single contract for 9,000,000 for the present year, but he believes it probable that their purchases altogether will exceed those of last year one-third. In preparing "noix-de-coco," the firm uses up from 20,000 to 25,000 nuts weekly, turning out 100 to 150 tons of the desiccated article. Their preparation has been introduced into Europe, and sales amounting to \$300,000 were made their last year.

The outer shells of the cocoa nut are taken to a mill carried on by the firm in Camden, where they are ground and burned, and the

result disposed of to manufacturers for adulterating purposes, spices being the principal condiments into which it enters. It is said to possess no deleterious properties, and its introduction into articles is claimed to have a wholesome effect as a dyspepsia corrective.

From the brown skin next to the meat of the nut an oil is manufactured which is largely used in the preparation of toilet-soaps and for other purposes. No use has yet been found for the "milk in the cocoanut," and that liquid is allowed to run off in the sewer.

DRILLING AND TURNING GLASS.

Glass may be readily drilled by using a steel drill hardened, but not drawn at all, wet with spirits of turpentine. Run the drill fast, and feed light. Grind the drill with a long point and plenty of clearance, and no difficulty will be experienced. The operation will be more speedy if the turpentine be saturated with camphor gum. With a hard tool thus lubricated, glass can be drilled with small holes, say up to three-sixteenths, about as rapidly as cast steel. A breast or row drill may be used, care being taken to hold the stock steady, so as not to break the drill.

To file glass, take a 12 inch mill file, single cut, and wet it with the above solution—turpentine saturated with camphor—and the work can be shaped as easily and almost as fast as if the material were brass.

To turn in a lathe, put a file in the tool stock, and wet with turpentine and camphor, as before. To square up glass tubes, put them on a hard wood mandrel, made by driving iron rod with centers through a block of cherry, chestnut, or soft maple, and use the flat of a single cut file in the tool post, wet as before. Run slow. Large holes may be rapidly cut by a tube-shaped steel tool cut like a file on the angular surface, or with fine teeth, after the manner of a rose bit, great care being necessary, of course, to back up the glass fairly with lead plates or otherwise, to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricated as before, neat jobs of boring and fitting glass may be made by these simple means. The whole secret is in good high steel worked low, tempered high, and wet with turpentine standing on camphor.—*Scientific American.*

The speed of a boat.—Can a boat on water or ice attain a greater speed than the wind that is blowing? What explanation can be given for the fact that a boat goes faster than the wind?—A. With a twenty mile per hour breeze ice boats have run, on fine ice, at the rate of 70 miles an hour. If you squeeze a suitable wedge between thumb and finger, you will find the wedge to move further and faster during the

squeeze than the fingers that impart the movement. On the same principle the ice boat, which is the wedge, may be driven three times or more faster than the propelling wind, when the latter acts against the inclined side or sail of the boat. If the wind were directly abaft, the boat would not go quite so fast as the wind.—*Scientific American.*

The following is quite a cheap and good perfume—Mix 1½ fluid ounces oil of lavender, ½ fluid ounce oil of rosemary, 1 fluid ounce oil of lemon, and 20 drops oil of cinnamon with one gallon alcohol.

TO MAKE RUBBER STAMPS.

Procure a vulcanizing apparatus provided with a thermometer and lamps such as dentists use. Have an iron printing frame or "chase," in which to lock types, and of such a size that the plaster mould made from it can be placed inside of the vulcanizer. Having set in the frame, with ordinary types, the words desired, a plaster cast of them is taken like an ordinary stereotype mould, that is, by first oiling the types, and pouring liquid plaster over them. When set, the mould is carefully taken off, and before it has had time to dry, a piece of sheet rubber, vulcanized and mixed with sulphur and soapstone, is placed on top of the mould and backed with a few sheets of paper. Then, with two iron plates provided with screws, the rubber is squeezed against the mould, the whole is immersed in the water in the vulcanizer, and the cap being screwed on, the heat is applied till a temperature of about 300° is reached. When the apparatus has cooled down, the mould and rubber are taken out, and the rubber is carefully removed. This is properly trimmed, and on being fastened with cement to an appropriate handle, forms a hand stamp ready for use. A solution of virgin caoutchouc in bisulphide of carbon cakes a good cement for wood and rubber.—*Druggists' Circular.*

FOR MENDING ALABASTER, ETC.

Add half a pint of vinegar to half a pint skimmed milk. Mix the curd with the whites of five eggs well beaten, and sufficient powdered quicklime sifted in with constant stirring, so as to form a paste.

Brass work can be polished by rubbing the metal with finely powdered tripoli mixed with linseed oil and applied with a rubber made from a piece of an old hat or felt. Or else a mixture of glycerine, stearine, napthaline, or creosote mixed with dilute sulphuric acid, can be used.